CLAIMS

1. In a multichannel optical path changing device that is constituted of resin optical waveguides and mirrors and that changes a direction of an optical path, a resin-made multichannel optical path changing device characterized in that the device has monolithically formed cores having a mirror therebetween and optical path directions changed, and that the device has multichannel cores simultaneously formed under a condition that their positional relationship is maintained.

2. A method for producing a resin-made, multichannel, optical path changing device according to claim 1, characterized in comprising steps of forming a parallelepiped block on a substrate by a cladding resin; forming a film of a core layer to cover the block by a core resin; and simultaneously forming cores having an optical path direction rectangularly changed, by selectively etching the core layer and the block.

3. A method for producing a resin-made, multichannel, optical path changing device according to claim 2, characterized in comprising two steps of:

1) forming a film of a lower cladding layer on the substrate by the cladding resin and then selectively etching the cladding layer, thereby forming a parallelepiped block by the cladding resin; and

2) forming the core layer to cover the cladding block by the core resin and selectively etching the core layer and the cladding resin block, thereby simultaneously forming a multichannel core that is monolithically formed of a core perpendicular to the substrate and a core parallel to the substrate.

4. A method for producing a resin-made, multichannel, optical path changing device according to claim 2 or claim 3, characterized in comprising a step of covering a multichannel core, which has been formed, with the cladding

resin, then forming a mirror surface at a corner portion of the core, and forming a cladding layer thereon.

5. A method for producing a resin-made, multichannel, optical path changing device according to any of claims 2 to 4, characterized in comprising six steps of:

1) forming a film of a sacrifice layer on a temporary substrate;

2) forming a film of a cladding layer thereon and selectively etching the cladding layer, thereby forming a parallelepiped block by the cladding resin;

3) forming a film of a core layer by a core resin to cover the block;

4) simultaneously forming a multichannel core having a core perpendicular to the substrate and a core parallel with the substrate, which are monolithically formed, by selectively etching the core layer and the block, and conducting a filling with a cladding resin;

5) forming a V-groove at a corner portion of the core in order to form a mirror surface and forming a reflecting film as the mirror surface; and

6) conducing a filling with a cladding resin, attaching a substrate thereon, and, after removing the temporary substrate of the step 1), conducting a cutting and separation into multichannel optical path changing devices.

6. A method for producing a resin-made, multichannel, optical path changing device according to claim 1, characterized in comprising a step of forming a film of a core layer on a substrate by a resin and simultaneously forming a plurality of cores, which have an optical path direction rectangularly changed, by selectively etching the core layer, under a condition that their positional relationship is maintained.

7. A method for producing a resin-made, multichannel, optical path changing device according to claim 6, which is a method for producing a resin-made, L-shaped, multichannel, optical path changing device and which is

characterized in comprising steps of forming a film of a core layer on a substrate by a core resin and removing a core resin of a portion interposed between the core of a horizontal portion and the core of a vertical portion, which constitute an L-shape, by selectively etching the core layer, thereby simultaneously forming a plurality of L-shaped cores, which have an optical path direction rectangularly changed, under a condition that their positional relationship is maintained.

8. A method for producing a resin-made, multichannel, optical path changing device according to claim 6 or claim 7, characterized in comprising steps of forming a parallelepiped block on a substrate by a core resin; forming a film of a cladding layer by a cladding resin to cover the block; and simultaneously forming a plurality of cores, which have an optical path direction rectangularly changed, by selectively etching the cladding layer and the block, under a condition that their positional relationship is maintained.

9. A method for producing a resin-made, multichannel, optical path changing device according to any of claim 6 to claim 8, which is a method for producing a resin-made, multichannel, optical path changing device and which is characterized in comprising steps of:

1) forming a film of a core layer on a substrate by a core resin and selectively etching the core layer, thereby forming a parallelepiped block by the core resin; and

2) forming a film of a cladding layer by a cladding resin to cover the core member block and selectively etching the cladding layer and the core resin block, thereby simultaneously forming a multichannel core having a core perpendicular to the substrate and a core parallel with the substrate, which are monolithically formed.

10. A method for producing a resin-made, multichannel, optical path changing device according to any of claim 6 to claim 9, which is a method for

producing a resin-made, multichannel, optical path changing device and which is characterized in comprising a step of covering the multichannel core, which has been formed, with a cladding resin, then forming a mirror surface at a corner portion of the core, and forming a cladding layer thereon.

11. A multichannel optical path changing device produced by a method according to any of claim 6 to claim 10.